DOCUMENT RESUME

ED 423 113 SE 061 631

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TITLE Animal Dissection. [Fact Sheet and Resource List Information Packet from the Humane Society of the United States].
INSTITUTION Humane Society of the United States, Washington, DC.
PUB DATE 1998-01-00
NOTE 15p.
AVAILABLE FROM Humane Society of the United States, 2100 L Street NW, Washington, DC 20037.
PUB TYPE Guides - Classroom - Teacher (052)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Audiovisual Instruction; *Computer Assisted Instruction; *Demonstrations (Science); *Dissection; Elementary Secondary Education; Higher Education; Interactive Video; *Laboratory Animals; Laboratory Procedures; Multimedia Materials; Optical Data Disks; *Science Education; Simulation; *Student Attitudes

ABSTRACT

Killing animals for classroom dissection causes animal suffering, cheapens the value of life, and depletes wild animal populations, yet it remains commonplace. The Humane Society of the United States (HSUS) addresses the issue in this information packet which includes a fact sheet and three resource lists "on Dissection." The fact sheet discusses the numbers of animals killed for dissection in schools, kinds of animals used, sources of animals, industry methods, lack of industry oversight, student feelings, legislation, available alternatives, educational pros and cons, and suggestions for student action. An annotated list of studies on attitudes toward dissection includes 13 studies of student attitudes from elementary school through medical school. A second annotated bibliography addresses comparative studies of dissection and other animal uses in education. These studies include comparisons of student performance between groups performing dissection and those learning using models, computer simulation, lecture, or sequential slides. The studies also review field-based animal research as opposed to laboratory-based studies of animal behavior. The Humane Society has an Alternatives Loan Program for materials that include CD-ROMs, videotapes, models, charts, computer diskettes, and slides which are labeled according to recommended educational level. Prices of loan materials are compared with costs of dissection as a point of reference. (PVD)

ANIMAL DISSECTION

THE CURRENT SITUATION

Killing animals for classroom dissection causes animal suffering, cheapens the value of life, and depletes wild animal populations, yet it remains commonplace. Concern is growing, however. Laws and policies now exist recognizing a student's right to use humane alternatives, ranging from CD-ROMs to 3-D plastic models. These laws and policies, combined with the emergence of newer, better alternatives, are placing dissection advocates increasingly on the defensive.

NUMBERS USED

No reliable figures exist for the numbers of animals killed for dissection in U.S. schools. Biological supply companies do not divulge complete or consistent information. A reasonable estimate is that about six million vertebrate animals are dissected yearly in U.S. high schools alone, with an additional, unknown number used in colleges and middle and elementary schools.[1] The number of invertebrate animals dissected is probably comparable to that of vertebrates.

KINDS OF ANIMALS USED

The most commonly dissected vertebrates are frogs, fetal pigs, and cats. Others include dogfish sharks, perch, rats, pigeons, salamanders, rabbits, mice, turtles, snakes, mink, foxes, and bats. Invertebrates include crayfish, grasshoppers, earthworms, clams, sea stars, squid, sea urchins, and cockroaches. One U.S. biological supply company sells more than 170 different species of preserved animals.

Some dissection exercises involve animal parts rather than whole animal bodies. Animal parts—including cows' eyes, hearts, and lungs and sheep brains—are sometimes obtained from slaughterhouses. Some teachers use chicken wings from the supermarket.

SOURCES OF ANIMALS

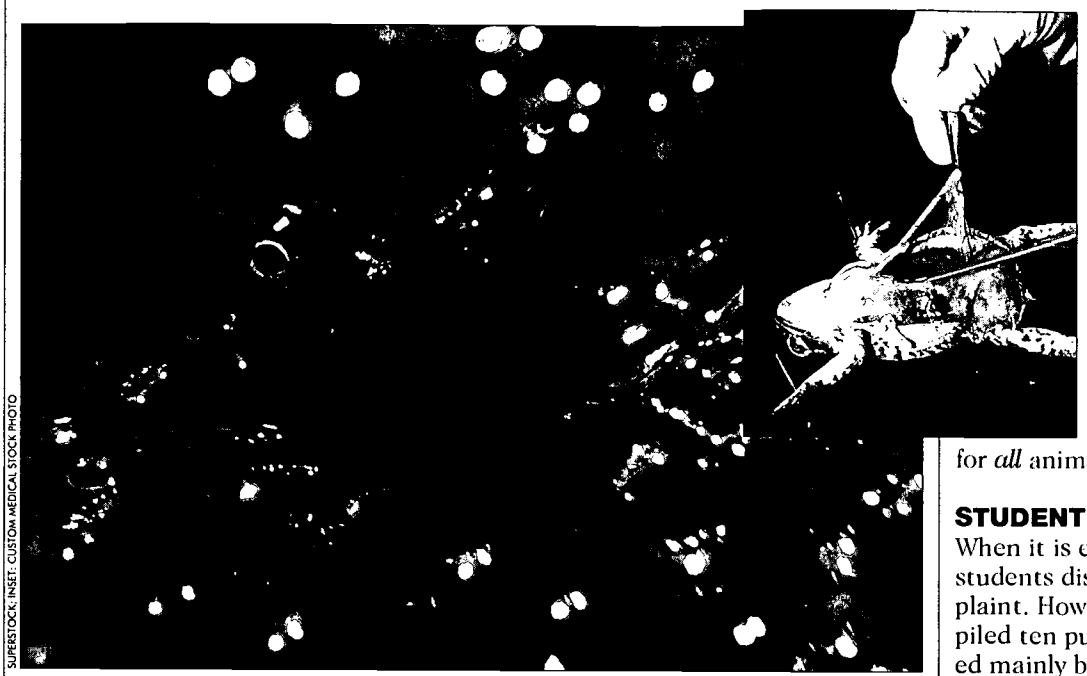
Most animals bound for dissection are taken from their natural habitats. Frogs, who alone make up half the vertebrates used in dissection, are captured from wetlands; dogfish sharks are targeted and ensnared in the nets of fishing trawlers; and snakes, turtles, perch, salamanders, stingrays, and others are wild-caught. Some cats are procured from animal shelters; others are supplied by animal dealers whose legal sources are breeders, owners, and shelters, but who are also known to acquire under false pretenses the animals they sell for dissection. Some species come from other industries that exploit animals: fetal pigs are removed from pregnant sows slaughtered for meat; mink, fox, and rabbit carcasses come, already skinned, from fur ranches.

INDUSTRY METHODS

Secrecy shrouding the operations of biological supply companies and their suppliers makes information hard to obtain. What is known of the procurement of animals used in dissection indicates that abuse and suffering are widespread. Video footage of People for the Ethical Treatment of Animals' 1990 undercover investigation of Carolina Biological Supply Company (CBSC), the nation's largest biological supplier, contains many disturbing images. Although CBSC officials had repeatedly claimed that the company handled only dead cats, the video shows live cats being roughly prodded into crowded gas chambers. It also shows rats struggling in restraining racks as they are embalmed alive and documents large, fully alive crabs being injected with deadly

CUSTOM MEDICAL STOCK PHOTO

Dissection remains a common classroom exercise, even though a wide range of humane, educationally sound alternatives is readily available.



SUPERSTOCK; INSET: CUSTOM MEDICAL STOCK PHOTO

Most animals bound for dissection are taken from their natural habitats. Frogs, who alone make up half the vertebrates used in dissection, are captured from wetlands. Three million frogs are killed for dissection each year.

chemical preservative.

In 1994 the World Society for the Protection of Animals (WSPA) investigated a Mexican biological supply company named PARMEESA. WSPA documented the drowning of thousands of cats, who were tied ten at a time into cloth sacks and submerged in large drums or in a nearby river. Some of these cats were people's companions, taken from neighborhood streets by collectors offering $1 per cat. All of the cats found were to have been shipped north for dissection in U.S. classrooms. In 1994 two separate Mexican government raids on a Mexican chicken farm found a total of thirteen hundred dead cats in a blood-stained barn; the cats' throats had been slit.

The only in-depth study of the collection of frogs for dissection was published in the life science journal *BioScience* in 1971.[2] The article investigates the frog-collection practices of four major U.S. biological supply companies operating at that time. The authors describe finding live frogs kept in nylon mesh bags for up to one week during shipping, with 50 to 100 frogs crowded into each bag. The frogs suffered extremes of temperature and dryness; an estimated 15 percent were dead after shipping. As many as half the frogs kept in sorting and holding pens of 20,000 to 30,000 frogs died during the winter before being shipped to buyers. The authors concluded that "nearly every step of the catching and shipping places severe stress on the frog." There is no indication that conditions for frogs have improved since the '70s.

LACK OF INDUSTRY OVERSIGHT

Scrutiny of the biological supply trade is minimal. Regulations drafted to enforce the U.S. Animal Welfare Act (AWA) exclude from protection all nonmammals and laboratory-bred rats and mice. Therefore, amphibians, birds, fish, and reptiles caught, housed, transported, and killed for dissection are not reported to or by the federal government.

The AWA requires the U.S. Department of Agriculture (USDA) to inspect biological supply companies (categorized as "class B dealers") at least once per year. The resulting two-page animal-care inspection reports provide only a snapshot of a facility at a particular moment. Most of the reports' questions address cage construction and sanitation and few have any comments about the animals themselves, perhaps because most animals on the premises are dead. The USDA considers dead animals beyond its concern. The HSUS has asked the USDA to require biological supply companies to report all their capture locations; methods of capture, transport, and killing; and total numbers of each species processed for *all* animals slated for dissection.

STUDENT FEELINGS

When it is expected of them, most students dissect without open complaint. However, The HSUS has compiled ten published surveys, conducted mainly by academic researchers, showing that many or most students harbor reservations about dissecting animals. Their reasons include the belief that it is wrong to kill an animal for an education lesson, physical aversion to cutting apart an animal, and a concern for the environment.

Another major criticism of dissection is that it tends to disregard the

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Cats used in dissection are bought from breeders, owners, and shelters; some dealers have posed as "caring new owners" for unwanted pets.

need for teaching and learning respect and compassion for other sentient life and the need for fostering stewardship of nature. Dissection is also criticized for turning many bright, sensitive students away from promising careers in the life sciences (e.g., medicine, veterinary medicine, nursing).

As the number of students who object to classroom practices harmful to animals grows, so do conflicts.[3] The toll-free dissection hotline, 1-800-922-FROG, operated by the National Anti-Vivisection Society, has received more than one hundred thousand calls since it was started by the Animal Legal Defense Fund in 1989. To address the student/teacher conflict problem, The HSUS held a day-long symposium in 1996 titled "The Dissection Controversy: Bridging the Teacher/Student Gap" (a three-videotape set from this symposium is available for loan). The HSUS also has prepared a packet of materials to help students and teachers work together to replace dissection with alternative classroom assignments.

LEGISLATION

As of June 1997, four states in the United States had dissection-choice laws: Florida (enacted 1985), California (1988), Pennsylvania (1992), and New York (1994). These laws give precollege students the option of not dissecting an animal. Instead, the students can choose another exercise not harmful to animals. Similar legislation has been introduced in Illinois, Louisiana, Massachusetts, New Jersey, and Rhode Island. A law requiring schools to publish information about available alternatives to dissection was supported by The HSUS in Maryland and recently passed. A dissection-choice policy was voluntarily adopted in 1989 by the Department of Education in Maine, after the policy failed to become enacted into law. Several other school boards around the nation have independently embraced choice policies. The majority of U.S. schools, however, have no dissection policies.

Internationally, the past decade has seen some significant changes. School dissection was banned in Argentina in 1987 and in the Slovak Republic in 1995. In 1993 the Italian Parliament passed a law recognizing the right of any person to refuse to participate in animal experimentation and dissection. In May 1997 animal dissection was reduced to an optional activity in India's schools, where up to six million animals are dissected yearly.

AVAILABLE ALTERNATIVES

Literally thousands of alternatives to dissection are available. Currently CD-ROMs are rapidly being added to an arsenal of conventional computer programs, with titles like *The Digital Frog*, *DissectionWorks*, and *The Ultimate Human Body*. Hundreds of videotapes are available; a series produced in Britain called *Vertebrate Dissection Guides* shows detailed dissections of the dogfish shark, the frog, the pigeon, and the rat, and an eight-tape U.S. series called *Cat Anatomy Instructional Videotape Series* provides an exhaustive review of the anatomy of the cat. Three-D plastic models exist for a wide range of animals, including cats, clams, frogs, grasshoppers, rats, sea stars, sharks, and even cows. There are also many highly sophisticated models and simulations of the human body.

The price of one of these materials is usually higher than that of a dissection specimen (although a single CD-ROM can cost less [$39.95] than a single preserved cat [up to $58.50 for a pregnant female injected with three colors of dye]). But when one adds up the costs of hundreds of animal carcasses discarded after each use, the economics overwhelmingly favor alternatives. A cost analysis conducted by The HSUS found that a typical high school can save thousands of dollars yearly by replacing animal dissections with alternatives equipment. (The analysis is part of the student/teacher packet. Contact The HSUS's Animal Research Issues staff for a copy.)

EDUCATIONAL PROS AND CONS

Dissection is often defended by biology teachers as the best way to teach anatomy, though published studies contradict this claim. A collection of twelve of these studies, compiled by The HSUS, shows that the academic performance of students using computer programs, 3-D models, and/or other materials is at least as good as that of students who dissect animals. Among the advantages of computer simulations are that they are repeatable, interactive, and self-paced; they can include animations and built-in quizzes; and of course, they are ethically noncontroversial.

Studying animals in their natural habitat is one exercise that can replace dissection. It teaches animal behavior and fosters respect for life and stewardship of nature.

WHAT YOU CAN DO

As a student: To dissect or not to dissect is ultimately up to you; everyone has the right to refuse to participate in educational exercises that violate

genuine ethical values. If animals will be dissected in your class, prepare your reason(s) for objecting to dissection. Present them to your teacher, preferably several weeks before the dissection starts and politely but firmly request an alternative assignment. It will help if you can provide specific suggestions for alternatives; The HSUS has more than a hundred dissection alternatives (3-D models, CD-ROMs, computer diskettes, videos, charts) available for loan. If you meet resistance, notify the school principal and the district superintendent and write a letter to your local paper. Perhaps your parents will be willing to talk to your teacher on your behalf.

As a teacher: Consider discontinuing animal dissection in your classes or at least giving students the opportunity to choose alternatives. Be sure to inform students of that opportunity; you can generate a valuable ethical discussion. You might first give your class the assignment of finding out where the animals being shipped to your school are from and how they are procured; then let the class vote to decide whether the school should support the supply company by buying animals from it. Borrow dissection alternatives from The HSUS.

As a concerned individual: If students in your area are not being offered a chance to choose alternatives, draft a policy requiring this choice and present it to your school and to the local parent/teacher association (PTA). If you are a parent, join the PTA and recommend that such a policy be drafted and adopted. Point out the economic, environmental, ethical, and social problems with killing animals for dissection.

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For more information on how you can help end the suffering and death of animals destined for dissection, please contact us at 301-258-3046; by fax: 301-258-3082; or by e-mail: *hsuslab@ix.netcom.com.* ■

1. This estimate was made by F. Barbara Orlans in *In the Name of Science: Issues in Responsible Animal Experimentation* (New York and Oxford: Oxford University Press, 1993). The estimate is an extrapolation from the number of U.S. high schools and students and the proportion of students who dissect animals.
2. Erich L. Gibbs, George W. Nace, and Marvin B. Emmons, "The Live Frog Is Almost Dead," *BioScience* 21, no. 20 (1971): 1027–34.
3. Jonathan Balcombe, "Student/Teacher Conflict Regarding Animal Dissection," *The American Biology Teacher* 59, no. 1 (1997): 22–25.

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ATTITUDES TOWARD DISSECTION: ANNOTATED LIST OF STUDIES

Compiled by Jonathan Balcombe, Ph.D.
The Humane Society of the United States, 1997

1. Adkins, J. and Lock, R. 1994. Using animals in secondary education: a pilot survey. *Journal of Biological Education* 28(1): 48-52.

A survey of teachers (28) in charge of biological sciences at schools/colleges showed extensive use of animals in the classroom. One in three educators surveyed argued against such use.

2. Bennett, J. 1994. New survey shows Colorado students want a choice. *Good Medicine* 3(3): 6.

Of 110 medical students surveyed, 78% supported a student's right to choose not to participate in required terminal dog labs, and 32% felt that, given a choice, they would not participate in such labs.

3. Bowd, A.D. 1993. Dissection as an instructional technique in secondary science: Choice and alternatives. *Society and Animals* 1(1): 83-88.

In a retrospective survey of 191 Canadian undergraduates, 69% were required to perform dissections in secondary school; 27% reported having exclusively negative reactions to dissection, and 38% reported both negative and positive reactions.

4. Brown, L.M. 1989. A demographic comparison of the perceptions of ninth grade students toward dissection and other uses of animals. Thesis for Teacher Leader Program, College of Education and Human Services, Wright State University, Dayton, Ohio.

Half of a group of 142 ninth graders responded that they would choose an alternative to dissection if provided and 90% believed that students should be given that choice.

5. Keith-Spiegel, P.C., Tabachnick, B.G. and Allen, M. 1993. Ethics and academia: Students' views of professors' actions. *Ethics & Behavior* 3(2): 149-162.

A survey of 482 undergraduates found that 62% felt that it would be unethical for their professor to require them to use electric shock on rats.

6. Lock, R. 1994. Dissection as an instructional technique in secondary science: Comment on Bowd. *Society and Animals* 2(1): 67-73.

A review of comparative studies on dissection practices finds that dissection and vivisection should be discussed in the classroom.

7. Lord, T. and Moses, R. 1994. College students' opinions about animal dissections. *Journal of College Science Teaching* 23(5): 267-270.

Of 200 undergraduates surveyed, 56% objected to performing live animal procedures and more than half said they would refuse to participate in the dissection of cats, rabbits or monkeys if the situation arose.

8. McKernan, R.-A. 1991. Student opinions about the use of dissection in science classes. Planning, Research and Accountability report. Albuquerque Public Schools: 21 pp.

Of 972 respondents to a survey of high school students, 72% felt that students should be allowed to use dissection alternatives. About 15-16% reported that they and/or other students asked for alternative lessons or to be excused from performing the dissection.

9. Millett, K. and Lock, R. 1992. GCSE students' attitudes towards animal use: some implications for biology/science teachers. *Journal of Biological Education* 26(3): 204-208.

In a survey of 468 14 and 15-year-old students, 72.5% felt that it is wrong to breed animals for dissection. 83.5% felt that alternatives to animal experimentation should be found. and 38% "would object to any animal material being used for dissection."

10. Smith, W. 1994. Use of animals and animal organs in schools: Practice and attitudes of teachers. *Journal of Biological Education* 28(2): 111-117.

In a survey of 106 Australian schools, 34 preferred observational or behavioral studies to animal experimentation, and natural habitats to classroom settings. Over half of the respondents reported ethical objections to dissection, and students nauseated by it.

11. Solot, D. and Arluke, A. 1997. Learning The Scientist's Role: Animal Dissection in Middle School. *Journal of Contemporary Ethnography* 26(1): 28-54.

This study of the responses of sixth graders to fetal pig dissections concluded that the exercise risks fostering callousness towards animals and nature, and that it may dissuade students, especially girls, from pursuing careers in scientific fields.

12. Willis, L.R. and Besch, H.R. 1994. Effect of experience on medical students' attitudes toward animal laboratories in pharmacology education. *Academic Physician and Scientist* March: 11-13.

A survey of 144 medical students showed that while most students found dog-labs to be helpful, 22% felt that this use of animals is morally wrong.

13. Arluke, A. and Hafferty, F. 1996. From apprehension to fascination with "Dog Lab:" The use of absolutions by medical students. *Journal of Contemporary Ethnography* 25(2): 201-225.

Medical students (41) initially felt moral uneasiness towards performing terminal procedures on live dogs, but they eventually were able to neutralize any feelings of moral guilt by learning absolutions (e.g., the staff killed the dogs) that permit denial of responsibility and wrongdoing.

COMPARATIVE STUDIES OF DISSECTION AND OTHER ANIMAL USES IN EDUCATION

Compiled by Jonathan Balcombe, Ph.D.
The Humane Society of the United States, 1996

1. Cohen, P.S. and Block, M. 1996. A field-based animal research approach for teaching learning and motivation. *Alternatives to Laboratory Animals* [submitted manuscript]

Overall performance ratings were equivalent between two groups of students, one that studied operant conditioning in a traditional lab using rats, and the other that studied feral pigeons in a city park.

2. Dewhurst, D.G., Hardcastle, J., Hardcastle, P.T., and Stuart, E. 1994. Comparison of a computer simulation program and a traditional laboratory practical class for teaching the principles of intestinal absorption. *American Journal of Physiology* 267 (*Advances in Physiology Education* 12/1): S95-S104.

Six second-year undergraduate students who worked independently using an interactive computer-assisted learning program achieved equal knowledge gain, at one-fifth the cost, as did eight students who worked under close supervision in a traditional laboratory using freshly killed rats.

3. Downie, R. and Meadows, J. 1995. Experience with a dissection opt-out scheme in university-level biology. *Journal of Biological Education* 29/3: 187-194.

The cumulative examination results of 308 students who studied model rats were the same as those of 2,605 students who performed rat dissections. Significant numbers of students in the study claimed that they chose to dissect mainly through concern over their examination results.

4. Fawver, A.L., Branch, C.E., Trentham, L., Robertson, B.T., and Beckett, S.D. 1990. A comparison of interactive videodisc instruction with live animal laboratories. *American Journal of Physiology* 259 (*Advances in Physiology Education* 4): S11-S14.

In this study involving 85 first-year veterinary students, use of interactive videodisc simulations yielded equivalent test performance and greater time efficiency in teaching cardiovascular physiology compared with instruction in a live-animal laboratory.

5. Greenfield, C.L., Johnson, A.L., Schaeffer, D.J., and Hungerford, L.L. 1995. Comparison of surgical skills of students trained with models or live animals. *Journal of the American Veterinary Medical Association* 206: 1840-1845.

Surgical skills of thirty-six third-year veterinary students were evaluated following training either with dogs and cats or with soft-tissue organ models. The performance of the two groups was equivalent.

6. Guy, J.F. and Frisby, A.J. 1992. Using interactive videodiscs to teach gross anatomy to undergraduates at The Ohio State University. *Academic Medicine* 67: 132-133.

In this study of 473 pre-nursing and pre-medicine students, the performance of those using computers (interactive videodiscs) was not significantly different from that of students in traditional cadaver-demonstration labs.

7. Jones, N.A., Olafson, R.P., and Sutin, J. 1978. Evaluation of a gross anatomy program without dissection. *Journal of Medical Education* 53: 198-205.

Learning performance of approximately 100 first-year Emory University medical students using films, computer-assisted instruction, and prosected human cadavers was equivalent to that of students taught using a traditional lecture-dissection program.

8. Lieb, M.J. 1985. Dissection: A valuable motivational tool or a trauma to the high school student? Thesis, Master of Education, National College of Education, Evanston, Illinois.

Post-test scores were equivalent for students who dissected earthworms and those who received a classroom lecture on earthworm anatomy.

9. McCollum, T.L. 1987. The effect of animal dissections on student acquisition of knowledge of and attitudes toward the animals dissected. Doctoral Dissertation, University of Cincinnati.

Half of a group of 350 high school biology students were taught frog structure, function, and adaptation via lecture, the other half by doing a frog dissection. Overall, students taught by lecture performed better on a post-test than did those taught by dissection.

10. More, D. and Ralph, C.L. 1992. A test of effectiveness of courseware in a college biology class. *J. Educational Technology Systems* 21: 79-84.

Half of a class of 184 first-year biology students used traditional animal-based laboratories while the remainder used computer courseware. Biology knowledge of the computer-taught students increased significantly more than did that of the traditional group.

11. Phelps, J.L., Nilsestuen, J.O., and Hosemann, S. 1992. Assessment of effectiveness of videodisc replacement of a live-animal physiology laboratory. Distinguished Papers Monograph, American Association for Respiratory Care.

Undergraduate nursing and respiratory-therapy students who studied using an interactive video program on cardiac output principles performed significantly better on a post-test than did a similar group taught with lecture and live-animal physiology laboratory.

12. Prentice, E.D., Metcalf, W.K., Quinn, T.H., Sharp, J.G., Jensen, R.H., and Holyoke, E.A. 1977. Stereoscopic anatomy: Evaluation of a new teaching system in human gross anatomy. *Journal of Medical Education* 52: 758-763.

Based on the learning performances of 16 physician's assistant students evaluated at the University of Nebraska Medical Center, the authors concluded that use of labeled sequential slides of anatomical dissections provided a viable alternative to dissection.

13. Samsel, R.W., Schmidt, G.A., Hall, J.B., Wood, L.D.H., Shroff, S.G., and Schumacker, P.T. 1994. Cardiovascular physiology teaching: Computer simulations vs. animal demonstrations. *Advances in Physiology Education* 11: S36-S46.

Medical students (110) used both computer demonstrations and animal (dog) demonstrations and rated the former higher for learning cardiovascular physiology.

14. Strauss, R.T. and Kinzie, M.B. 1994. Student achievement and attitudes in a pilot study comparing an interactive videodisc simulation to conventional dissection. *The American Biology Teacher* 56(7): 398-402.

Two groups of high school students (total n = 20) performed equally on a test following either animal dissection or interactive videodisc simulation.

ALTERNATIVES TO DISSECTION
BORROW THEM AND SAVE!

The Humane Society of the United States (HSUS) has an **ALTERNATIVES LOAN PROGRAM** to provide students and educators with up-to-date alternatives to classroom animal dissection and live animal experimentation. The number of students and teachers seeking humane alternatives to traditional classroom exercises harmful to animals continues to rise. It is therefore important that alternative resources be made readily available to all who need them. The materials listed below are now available for loan. The only cost to you is return postage.

All computer-based materials are for Windows unless otherwise indicated. We have also included, for three commonly dissected animal species, estimates of the relative cost for a typical school (270 students over 3 years, 2 students per animal specimen) to purchase a range of alternative resources compared with purchasing animal carcasses for dissection. We used median prices from biological supply catalogues.

recommended educational level:

M = Middle school *H = High school* *C = College*

CAT

CD-ROM:

Neotek Cat Dissection Laboratory *H C*
CatLab 2.2 (cat anatomy) *H C*

Videotapes:

Cat Anatomy Instructional Videotape Series *C*
- Cardiovascular Part I: heart structures and 33 veins identified
- Cardiovascular Part II: 17 arteries in the thorax, forelimb & neck
- Cardiovascular Part III: 18 arteries are identified in the abdomen and hind limb
- Digestive System: 33 structures identified, including accessory organs
- Muscular System Part I: major muscles of the hind limb and hip
- Muscular System Part II: major muscles of shoulder, back and forelimb
- Muscular System Part III: major muscles of the chest, abdomen, head and neck
- Urinary and Female & Male Reproductive Systems: 33 structures identified

Boreal Cat Dissection (30 mins) *M H*

Slides:

Cat Anatomy 35mm Slide Set *H C*

RELATIVE COST TO PURCHASE ALTERNATIVES

Alternatives:

Cat Dissection Model	$ 400.00
Micron BioSystems Cat Anatomy Videotape Series (8 tapes)	$1,295.00
Dissection Video (39 min)	$ 69.95

30 Dissection of the Cat (book, 64pgs)	$ 285.00
CatLab (computer program)	$ 149.95
VCR	$ 190.00
Total	**$2,389.90**

Dissection:

Price Range for 1 cat: $28.50 - $56.80 (Median $42.65)	
$42.65 x 135	$5,757.75
Supplies*	$ 974.25
Total	**$6,732.00**

>>>ALTERNATIVES SAVE $4,342.10 <<<

FROG

CD-ROMs:

The Digital Frog (frog anatomy and ecology) (Mac and Windows) *H C*
DissectionWorks (individual species, or series including frog) *H C*

For Macintosh:

Biolab Frog (anatomy and physiology of the frog) *M H C*
DissectionWorks Deluxe (includes frog) *H C*

Videotapes:

Vertebrate Dissection Guides (42 mins) *H C*
Biological Dissection (ca. 34 mins, includes frog) *M H*

Models:

The Great American Bullfrog (2) *M H C*
Frog (female x 2; male x 2) *M H C*

Charts:

Biocam Concise Dissection Charts (frog) *H C*

RELATIVE COST TO PURCHASE ALTERNATIVES

Alternatives:

Vertebrate Dissection Guides w/booklet (42min. video)	$ 75.00
Frog Inside Out Video (67 mins.)	$ 159.00
30 Atlas of Frog Anatomy (book)	$ 268.50
The Great American Bullfrog (model)	$ 533.00
The Digital Frog (Interactive CD-ROM	$ 150.00
DissectionWorks (CD-ROM)	$ 95.00
30 BioCam Concise Dissection Charts (Frog)	$ 90.00
Equipment	$ 515.00
Total	**$1,037.50**

Dissection:

Price Range for 1 Bullfrog: $5.50 - $13.10 (Median $9.30)	
$9.30 x 135	$1,255.50
Supplies*	$ 974.25
Total	**$2,229.75**

> > > ALTERNATIVES SAVE $993.80 < < <

PIG

CD-ROMs:

DissectionWorks (individual species, or series including pig) *H C*

For Macintosh:

Biolab Pig (anatomy and physiology of the fetal pig) *H C*

DissectionWorks Deluxe (includes pig) *H C*

Computer Diskettes:

For Macintosh:

The Fetal Pig (pig anatomy) *M H*

Videotapes:

Dissection and Anatomy of the Fetal Pig (26 minutes) *M H?*

Models:

Fetal Pig (female) *M H C*

Charts:

Biocam Concise Dissection Charts (fetal pig; pig heart) *H C*

RELATIVE COST TO PURCHASE ALTERNATIVES

Alternatives:

Fetal Pig Female (model)	$ 295.00
The Fetal Pig (computer program)	$ 30.00
30 BioCam Concise Dissection Charts (Fetal Pig)	$ 90.00
DissectionWorks (CD-ROM)	$ 95.00
30 Dissection of the Fetal Pig (book, 56pgs)	$ 285.00
The Anatomy of the Fetal Pig (video)	$ 79.95
Equipment*	$ 515.00
Total	**$1,389.95**

Dissection:

Price Range for 1 fetal pig: $1.50 - $9.95 (Median $5.73)	
$5.73 x 135	$ 773.55
Supplies*	$ 974.25
Total	**$1,747.80**

> > > ALTERNATIVES SAVE $357.80 < < <

HUMAN

CD-ROMs:

A.D.A.M. Practice Practical *H C*

A.D.A.M. Essentials (pre-college human anatomy) *M H*

A.D.A.M. Muscle Physiology (Mac and Windows) *H C*

A.D.A.M. Cardiovascular Physiology (Mac and Windows) *H C*

A.D.A.M. Respiratory Physiology (Mac and Windows) *H C*

A.D.A.M. Nervous System Physiology (Mac and Windows) *H C*

A.D.A.M. Urinary System Physiology (Mac and Windows) *H C*

A.D.A.M. Interactive Anatomy *H C*

A.D.A.M. Standard (undergraduate human anatomy) *C*

A.D.A.M. Nine Month Miracle (human gestation and birth) *H C*
Body Works Classic Edition (human anatomy) *M H*
Body Works 5.0 (human anatomy) *M H*
The Dynamic Human *M H*
Human Anatomy (14,000 references to over 6,000 photos of the human body) *C*
The Ultimate Human Body (human anatomy) *M H*
3D Body Adventure (human anatomy) *M H*

for Macintosh:
Visible Human (>10,000 images of a male human body) *H C*

Models:
Maniken INTRO (includes clay for forming and attaching muscles to model) *M H*

OTHER SPECIES

SHEEP BRAIN: Chart--Biocam Concise Dissection Chart *H C*

RAT: Diskette--The Rat Stack (Macintosh) *H C*
Video--The Rat: A Practical Dissection Guide (20 mins) *H C*
Video--Vertebrate Dissection Guides (57 mins) *H C*
Video--Investigation of a Mammal (Rat) (31 mins) *H C*
Chart--Biocam Concise Dissection Chart *H C*

PIGEON: Video--Vertebrate Dissection Guides (50 mins) *H C*

PERCH: CD-ROM--Dissection Works *H C*
CD-ROM- Dissection Works (series, includes perch) (Mac and Windows) *H C*
Video--Biological Dissection (ca. 34 mins, includes perch) *M H*
Chart--Biocam Concise Dissection Chart *H C*

SHARK: Video--Vertebrate Dissection Guides (53 mins) *H C*

CLAM: Video--Dissection & Anatomy of the Clam (8 min) *M H C*
Chart--Biocam Concise Dissection Chart *H C*

STARFISH: CD-ROM--Biolab Invertebrate (includes sea star) (Macintosh) *M H C*
Video--Boreal Starfish Video (ca. 30 mins) *M H C*
Chart--Biocam Concise Dissection Chart *H C*

EARTHWORM: CD-ROM-- DissectionWorks *H C*
CD-ROM— DissectionWorks (series, includes earthworm) (Mac and Windows) *H C*
CD-ROM--BioLab Invertebrate (includes earthworm) (Macintosh) *M H C*
Video--Biological Dissection (ca. 34 mins, includes earthworm) *M H*
Video--Dissection & Anatomy of the Earthworm (10 mins) *H C*
Chart--Biocam Concise Dissection Chart *H C*

GRASSHOPPER: Video--Dissection & Anatomy of the Grasshopper (8 mins) *H C*
Chart--Biocam Concise Dissection Chart *H C*

CRAYFISH: CD-ROM--DissectionWorks *H C*
CD-ROM— DissectionWorks (series, includes crayfish) (Windows and Mac) *H C*
CD-ROM--BioLab Invertebrate (includes crayfish) (Macintosh) *M H C*
Video--Boreal Crayfish Dissection (ca. 30 mins) *M H C*
Video--Biological Dissection (ca. 34 mins, includes crayfish) *M H*
Chart--Biocam Concise Dissection Chart *H C*

OTHER DISCIPLINES:

GENETICS: CD-ROM--BioLab Fly (principles of genetics) *M H C*
Diskette--HyperFly (fruit fly genetics) *C*

PHYSIOLOGY: Diskette--Biology Laboratory Series (Macintosh)
includes the following programs: Cockroach Nerve Cord, Crab Ion Balance, Crayfish Membrane Potential Lab, Effect of Size on Mouse Metabolism, Frog Gastrocnemius Muscle, Frog Heart, Frog Sciatic Nerve, Human Electrocardiogram, Human Lung, Postsynaptic Potentials in Crab Stretcher Muscle, Postsynaptic Potentials Lab, Rat Uterus Smooth Muscle Lab, Mouse Thyroid Gland, Water and Ion Movement Across Frog Skin

PSYCHOLOGY: Diskette--CC.Dog (classical conditioning) *C*
Diskette--Op.Rat (operant psychology) *C*
Diskette--Sniffy the Virtual Rat (operant psychology) *C*

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* **Supplies and Equipment** (included in cost-comparisons for each animal)

Dissection: (reusable each year for three years)

Student Dissection Set $7.40 each x 45		$ 333.00
Scissors, student grade, 4 1/2"	Molded Plastic Case	
6 Dissecting "T" Pins	Forceps, dissection, 4 1/2"	
Mall Probe and Seeker	Disposable Scalpel	
Transparent Ruler	Straight Teasing Needle	
Dropping Pipet	Angular Teasing Needle	
Aluminum Dissecting Pan with Vinyl $14.25 each x 45		$ 641.25
Total		$ 974.25

Alternatives:

VCR	$ 190.00
CD-ROM player	$ 325.00
Total	$ 515.00

For more information, please contact:

Jonathan Balcombe, Ph.D., Associate Director for Education
The Humane Society of the United States, 2100 L Street, NW, Washington, DC 20037
Phone: 301-258-3046 / Fax: 301-258-7760 e-mail: balcombe@ix.netcom.com

HSUS Alternatives Loan Program

BORROWER CONTRACT

Date: _____

Item(s) loaned:

_____ _____

_____ _____

The undersigned agrees to receive, on a free-of-charge, loan basis from The HSUS, the item(s) listed above that can be used as a dissection alternative. In return, the undersigned agrees to return the item(s) undamaged and in its entirety, to the individual at the address below no later than the date specified below.

The undersigned also agrees to furnish The HSUS with a valid Visa, MasterCard or Discover Card credit card number as security for the return of said item(s). He/she also understands and agrees that no charges against his/her credit card will be made unless the item(s) is not returned by the specified date, or is returned damaged in whole or in part due to any negligence by the borrower or by third parties. In such cases, The HSUS will either charge to the credit card listed below the total cost of the item(s) [$] or the cost of replacing damaged or missing parts, whichever is less.

Circle One: Visa MasterCard Discover Card

Credit Card Number:_____Expiration Date:_____

Print Name as it Appears on Credit Card: _____

Signature of Credit Card Holder: _____

To Be Returned No Later Than: _____

If you would like to defray some of the costs to The HSUS for operating and expanding our Alternatives Loan Program, please indicate the amount below. For your convenience, we will charge it to the above credit card account.

Donation to ALP: $10.00 ___ $15.00 ___ $20.00 ___ $25.00 ___ other $ ___

Please return shipments via **UPS** or **insured US Mail** to:
Animal Research Issues
The Humane Society of the United States,
2100 L Street NW, Washington, DC 20037

ED 416 631

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